

CLAIMS

What is claimed is:

- 1 1. (Original) An apparatus that provides a radio frequency energy to a probe placed in
2 contact with a cornea to perform a medical procedure, comprising:
3 a radio frequency circuit that delivers a radio frequency energy to the cornea through the probe;
4 and,
5 a regulator circuit that controls the radio frequency energy delivered to the cornea during the
6 medical procedure.
- 1 2. (Original) The apparatus of claim 1, further comprising a sensing circuit that senses a
2 change in a physiology of the cornea during the medical procedure and provides a feedback to
3 said regulator circuit.
- 1 3. (Original) The apparatus of claim 2, wherein said sensing circuit senses a current
2 delivered to the cornea.
- 1 4. (Original) The apparatus of claim 2, wherein said sensing circuit senses a voltage
2 delivered to the cornea.
- 1 5. (Original) The apparatus of claim 2, wherein said sensing circuit senses a temperature of
2 the cornea.
- 1 6. (Original) The apparatus of claim 2, wherein said sensing circuit senses an impedance of
2 the cornea.
- 1 7. (Original) The apparatus of claim 2, wherein said sensing circuit senses a moisture of
2 the cornea.

1 8. (Original) The apparatus of claim 1, wherein said regulator circuit controls the delivery
2 of the radio frequency energy about a set-point.

1 9. (Original) The apparatus of claim 1, wherein said regulator circuit controls the delivery
2 of the radio frequency energy about a set-curve.

1 10. (Original) The apparatus of claim 2, wherein said regulator circuit determines a profile
2 of a physiological parameter and regulates the radio frequency energy delivered to the cornea in
3 accordance with the profile.

1 11. (Original) The apparatus of claim 10, wherein the profile is an impedance profile.

1 12. (Original) The apparatus of claim 10, wherein the profile is a temperature profile.

1 13. (Original) The apparatus of claim 10, wherein the profile is a moisture profile.

1 14. (Original) The apparatus of claim 10, wherein said regulator circuit decreases the radio
2 frequency energy if the profile includes an increase in impedance beyond a threshold level during
3 the medical procedure.

1 15. (Original) The apparatus of claim 10, wherein said regulator circuit terminates delivery
2 of the radio frequency energy if the profile exceeds a threshold level during the medical
3 procedure.

1 16. (Original) The apparatus of claim 10, wherein said regulator circuit terminates delivery
2 of the radio frequency energy if the profile includes a slope that exceeds a threshold level during
3 the medical procedure.

1 17. (Original) The apparatus of claim 16, wherein said regulator circuit modulates a duration
2 of the delivery of the radio frequency energy.

1 18. (Original) The apparatus of claim 17, wherein said duration is modulated in response to
2 changes in a profile of the physiological parameter.

1 19. (Original) The apparatus of claim 18, wherein the physiological parameter is an
2 impedance.

1 20. (Original) The apparatus of claim 18, wherein the physiological parameter is a
2 temperature.

1 21. (Original) The apparatus of claim 18, wherein the physiological parameter is a tissue
2 moisture.

1 22. (Original) The apparatus of claim 1, wherein said regulator circuit modulates a level of
2 the radio frequency energy.

1 23. (Original) An apparatus that provides a radio frequency energy to a probe placed in
2 contact with a cornea to perform a medical procedure, comprising:
3 a radio frequency circuit that delivers a radio frequency energy to the cornea through the probe;
4 and,
5 regulator circuit means for controlling the radio frequency energy delivered to cornea during the
6 medical procedure.

1 24. (Original) The apparatus of claim 23, further comprising sensing circuit means for
2 sensing a change in a physiology of the cornea during the medical procedure and providing a
3 feedback to said regulator circuit.

1 25. (Original) The apparatus of claim 24, wherein said sensing circuit means senses a
2 current delivered to the cornea.

- 1 26. (Original) The apparatus of claim 24, wherein said sensing circuit means senses a
2 voltage delivered to the cornea.
- 1 27. (Original) The apparatus of claim 24, wherein said sensing circuit means senses a
2 temperature of the cornea.
- 1 28. (Original) The apparatus of claim 24, wherein said sensing circuit means senses an
2 impedance of the cornea.
- 1 29. (Original) The apparatus of claim 24, wherein said sensing circuit means senses a
2 moisture of the cornea.
- 1 30. (Original) The apparatus of claim 23, wherein said regulator circuit means controls the
2 delivery of the radio frequency energy about a set-point.
- 1 31. (Original) The apparatus of claim 23, wherein said regulator circuit means controls the
2 delivery of the radio frequency energy about a set-curve.
- 1 32. (Original) The apparatus of claim 24, wherein said regulator circuit means determines a
2 profile of a physiological parameter and regulates the radio frequency energy delivered to the
3 cornea in accordance with the profile.
- 1 33. (Original) The apparatus of claim 32, wherein the profile is an impedance profile.
- 1 34. (Original) The apparatus of claim 32, wherein the profile is a temperature profile.
- 1 35. (Original) The apparatus of claim 32, wherein the profile is a moisture profile.

1 36. (Original) The apparatus of claim 32, wherein said regulator circuit means decreases the
2 radio frequency energy if the profile includes an increase in impedance beyond a threshold level
3 during the medical procedure.

1 37. (Original) The apparatus of claim 32, wherein said regulator circuit means terminates
2 delivery of the radio frequency energy if the profile exceeds a threshold level during the medical
3 procedure.

1 38. (Original) The apparatus of claim 32, wherein said regulator circuit means terminates
2 delivery of the radio frequency energy if the profile includes a slope that exceeds a threshold
3 level during the medical procedure.

1 39. The apparatus of claim 23, wherein said regulator circuit means modulates a duration of
2 the delivery of the radio frequency energy.

1 40. (Original) The apparatus of claim 39, wherein said duration is modulated in response to
2 changes in a profile of the physiological parameter.

1 41. (Original) The apparatus of claim 40, wherein the physiological parameter is an
2 impedance.

1 42. (Original) The apparatus of claim 40, wherein the physiological parameter is a
2 temperature.

1 43. (Original) The apparatus of claim 40, wherein the physiological parameter is a tissue
2 moisture.

1 44. (Original) The apparatus of claim 23, wherein said regulator circuit means modulates a
2 level of the radio frequency energy.

1 45. (Withdrawn) A method for performing a medical procedure on a cornea, comprising:
2 placing a probe in contact with a cornea;
3 delivering a radio frequency energy to the cornea through the probe; and,
4 regulating the radio frequency energy delivered to cornea during the medical procedure.

1 46. (Withdrawn) The method of claim 45, further comprising sensing and feeding back a
2 change in a physiology of the cornea during the medical procedure and regulating the radio
3 frequency energy delivered to the cornea as a function of the feedback.

1 47. (Withdrawn) The method of claim 46, wherein a current delivered to the cornea is
2 sensed during the medical procedure.

1 48. (Withdrawn) The method of claim 46, wherein a voltage delivered to the cornea is
2 sensed during the medical procedure.

1 49. (Withdrawn) The method of claim 46, wherein a temperature of the cornea is sensed
2 during the medical procedure.

1 50. (Withdrawn) The method of claim 46, wherein an impedance of the cornea is sensed
2 during the medical procedure.

1 51. (Withdrawn) The method of claim 46, wherein said a moisture of the cornea is sensed
2 during the medical procedure.

1 52. (Withdrawn) The method of claim 45, wherein the radio frequency energy is regulated
2 about a set-point.

1 53. (Withdrawn) The method of claim 45, wherein the radio frequency energy is regulated
2 about a set-curve.

1 54. (Withdrawn) The method of claim 46, wherein a profile of a physiological parameter is
2 determined and the radio frequency energy delivered to the cornea is regulated in accordance
3 with the profile.

1 55. (Withdrawn) The method of claim 54, wherein the profile is an impedance profile.

1 56. (Withdrawn) The method of claim 54, wherein the profile is a temperature profile.

1 57. (Withdrawn) The method of claim 54, wherein the profile is a moisture profile.

1 58. (Withdrawn) The method of claim 54, wherein regulating includes decreasing the radio
2 frequency energy if the profile includes an increase in impedance beyond a threshold level during
3 the medical procedure.

1 59. (Withdrawn) The method of claim 54, wherein regulating includes terminating delivery of
2 the radio frequency energy if the profile exceeds a threshold level during the medical procedure.

1 60. (Withdrawn) The method of claim 54, wherein regulating includes terminating delivery
2 of the radio frequency energy if the profile includes a slope that exceeds a threshold level during
3 the medical procedure.

1 61. (Withdrawn) The method of claim 45, wherein regulating includes modulating a
2 duration of the delivery of the radio frequency energy.

1 62. (Withdrawn) The method of claim 61, wherein the duration is modulated in response to
2 changes in a profile of the physiological parameter.

1 63. (Withdrawn) The method of claim 61, wherein the physiological parameter is an
2 impedance.

1 64. (Withdrawn) The method of claim 61, wherein the physiological parameter is a
2 temperature.

1 65. (Withdrawn) The method of claim 61, wherein the physiological parameter is a tissue
2 moisture.

1 66. (Withdrawn) The method of claim 45, wherein regulating includes modulating a level of
2 the radio frequency energy.

1 67. (Original) An apparatus that provides a radio frequency energy to a probe placed in
2 contact with a cornea to perform a medical procedure, comprising:
3 a radio frequency circuit that delivers a radio frequency energy to the cornea through the probe;
4 and,
5 a sensing circuit that senses a change in a physiology of the cornea while said radio frequency
6 circuit delivers the radio frequency energy to the cornea.

1 68. (Original) The apparatus of claim 67, wherein said sensing circuit senses a current
2 delivered to the cornea.

1 69. (Original) The apparatus of claim 67, wherein said sensing circuit senses a voltage
2 delivered to the cornea.

1 70. (Original) The apparatus of claim 67, wherein said sensing circuit senses a temperature
2 of the cornea.

1 71. (Original) The apparatus of claim 67, wherein said sensing circuit senses an impedance
2 of the cornea.

1 72. (Original) The apparatus of claim 67, wherein said sensing circuit senses a moisture of
2 the cornea.

1 73. (Original) An apparatus that provides a radio frequency energy to a probe placed in
2 contact with a cornea to perform a medical procedure, comprising:
3 a radio frequency circuit that delivers a radio frequency energy to the cornea through the probe;
4 and,
5 sensing means for sensing a change in a physiology of the cornea while said radio frequency
6 circuit delivers the radio frequency energy delivered to the cornea.

1 74. (Original) The apparatus of claim 73, wherein said sensing means senses a current
2 delivered to the cornea.

1 75. The apparatus of claim 73, wherein said sensing means senses a voltage delivered to the
2 cornea.

1 76. (Original) The apparatus of claim 73, wherein said sensing means senses a temperature
2 of the cornea.

1 77. (Original) The apparatus of claim 73, wherein said sensing means senses an impedance
2 of the cornea.

1 78. (Original) The apparatus of claim 73, wherein said sensing means senses an impedance
2 of the cornea.

1 79. (Withdrawn) A method for performing a medical procedure on a cornea, comprising:
2 placing a probe in contact with a cornea;
3 delivering a radio frequency energy to the cornea through the probe; and,
4 sensing a change in a physiology of the cornea while the radio frequency energy is delivered to
5 the cornea.

1 80. (Withdrawn) The method of claim 79, wherein a current delivered to the cornea is
2 sensed while the radio frequency energy is delivered to the cornea.

1 81. (Withdrawn) The method of claim 79, wherein a voltage delivered to the cornea is
2 sensed while the radio frequency energy is delivered to the cornea.

1 82. (Withdrawn) The method of claim 79, wherein an impedance of the cornea is sensed
2 while the radio frequency energy is delivered to the cornea.

1 83. (Withdrawn) The method of claim 79, wherein a temperature of the cornea is sensed
2 while the radio frequency energy is delivered to the cornea.

1 84. (Withdrawn) The method of claim 79, wherein a moisture of the cornea is sensed while
2 the radio frequency energy is delivered to the cornea.

1 85. (Original) An apparatus that provides a non-thermal energy to a cornea through a probe
2 to perform a medical procedure that denatures collagen tissue and reshapes the cornea,
3 comprising:
4 an energy circuit that delivers a non-thermal energy to the cornea through the probe; and,
5 a regulator circuit that controls the non-thermal energy delivered to the cornea during the medical
6 procedure.

1 86. (Original) The apparatus of claim 85, wherein the non-thermal energy is in a microwave
2 frequency range.

1 87. (Original) The apparatus of claim 85, wherein the non-thermal energy is in an ultrasonic
2 frequency range.

1 88. (Original) The apparatus of claim 85, wherein the non-thermal energy is light.

1 89. (Original) The apparatus of claim 85, wherein the non-thermal energy is direct current.

1 90. (Original) The apparatus of claim 85, further comprising a sensing circuit that senses a
2 change in a physiology of the cornea during the medical procedure and provides a feedback to
3 said regulator circuit.

1 91. (Original) The apparatus of claim 90, wherein said sensing circuit senses a current
2 delivered to the cornea.

1 92. (Original) The apparatus of claim 90, wherein said sensing circuit senses a voltage
2 delivered to the cornea.

1 93. (Original) The apparatus of claim 90, wherein said sensing circuit senses a temperature
2 of the cornea.

1 94. (Original) The apparatus of claim 90, wherein said sensing circuit senses an impedance
2 of the cornea.

1 95. (Original) The apparatus of claim 90, wherein said sensing circuit senses an optical
2 characteristic of the cornea.

1 96. (Original) The apparatus of claim 85, wherein said regulator circuit controls the delivery
2 of the non-thermal energy about a set-point.

1 97. (Original) The apparatus of claim 85, wherein said regulator circuit controls the delivery
2 of the non-thermal energy about a set-curve.

1 98. (Original) The apparatus of claim 90, wherein said regulator circuit determines a profile
2 of a physiological parameter and regulates the non-thermal energy delivered to the cornea in
3 accordance with the profile.

1 99. (Original) The apparatus of claim 98, wherein said regulator circuit decreases the non-
2 thermal energy if the profile displays changes indicative of necrotic collagen structural
3 modification beyond a threshold level during the medical procedure.

1 100. (Original) The apparatus of claim 98, wherein said regulator circuit terminates delivery
2 of the non-thermal energy if the profile exceeds a threshold level during the medical procedure.

1 101. (Original) The apparatus of claim 98, wherein said regulator circuit terminates delivery
2 of the non-thermal energy if the profile includes a slope that exceeds a threshold level during the
3 medical procedure.

1 102. (Original) The apparatus of claim 85, wherein said regulator circuit modulates a duration
2 of the delivery of the non-thermal energy.

1 103. (Original) The apparatus of claim 85, wherein said regulator circuit modulates a level of
2 the non-thermal energy.

1 104. (Original) An apparatus that provides a non-thermal energy to a cornea through a probe
2 to perform a medical procedure that denatures collagen tissue and reshapes the cornea,
3 comprising:
4 an energy circuit that delivers a non-thermal energy to the cornea through the probe; and,
5 regulator circuit means for controlling the non-thermal energy delivered to cornea during the
6 medical procedure.

1 105. (Original) The apparatus of claim 104, wherein the non-thermal energy is in a
2 microwave frequency range.

1 106. (Original) The apparatus of claim 104, wherein the non-thermal energy is in an
2 ultrasonic frequency range.

1 107. (Original) The apparatus of claim 104, wherein the non-thermal energy is light.

1 108. (Original) The apparatus of claim 104, wherein the non-thermal energy is direct current.

1 109. (Original) The apparatus of claim 104, further comprising sensing circuit means for
2 sensing a change in a physiology of the cornea during the medical procedure and providing a
3 feedback to said regulator circuit.

1 110. (Original) The apparatus of claim 109, wherein said sensing circuit means senses a
2 current delivered to the cornea.

1 111. (Original) The apparatus of claim 109, wherein said sensing circuit means senses a
2 voltage delivered to the cornea.

1 112. (Original) The apparatus of claim 109, wherein said sensing circuit means senses a
2 temperature of the cornea.

1 113. (Original) The apparatus of claim 109, wherein said sensing circuit means senses an
2 impedance of the cornea.

1 114. (Original) The apparatus of claim 109, wherein said sensing circuit means senses an
2 optical characteristic of the cornea.

1 115. (Original) The apparatus of claim 104, wherein said regulator circuit means controls the
2 delivery of the non-thermal energy about a set-point.

1 116. (Original) The apparatus of claim 104, wherein said regulator circuit means controls the
2 delivery of the non-thermal energy about a set-curve.

1 117. (Original) The apparatus of claim 109, wherein said regulator circuit means determines a
2 profile of a physiological parameter and regulates the non-thermal energy delivered to the cornea
3 in accordance with the profile.

1 118. (Original) The apparatus of claim 117, wherein said regulator circuit means decreases
2 the non-thermal energy if the profile displays changes indicative of necrotic collagen structural
3 modification beyond a threshold level during the medical procedure.

1 119. (Original) The apparatus of claim 114, wherein said regulator circuit means terminates
2 delivery of the non-thermal energy if the profile exceeds a threshold level during the medical
3 procedure.

1 120. (Original) The apparatus of claim 114, wherein said regulator circuit means terminates
2 delivery of the non-thermal energy if the profile includes a slope that exceeds a threshold level
3 during the medical procedure.

1 121. (Original) The apparatus of claim 104, wherein said regulator circuit means modulates a
2 duration of the delivery of the non-thermal energy.

1 122. (Original) The apparatus of claim 104, wherein said regulator circuit modulates a level
2 of the non-thermal energy.

1 123. (Withdrawn) A method for performing a medical procedure on a cornea, comprising:
2 contacting a cornea with a probe;
3 delivering a non-thermal energy to the cornea through the probe to denature collagen tissue and
4 reshape the cornea; and,
5 regulating the non-thermal energy delivered to cornea during the medical procedure.

1 124. (Withdrawn) The method of claim 123, wherein the non-thermal energy is in a
2 microwave frequency range.

1 125. (Withdrawn) The method of claim 123, wherein the non-thermal energy is in an
2 ultrasonic frequency range.

1 126. (Withdrawn) The method of claim 123, wherein the non-thermal energy is light.

1 127. (Withdrawn) The method of claim 123, wherein the non-thermal energy is direct current.

1 128. (Withdrawn) The method of claim 123, further comprising sensing a change in a
2 physiology of the cornea during the medical procedure and regulating the non-thermal energy
3 delivered to the cornea as a function of the feedback.

1 129. (Withdrawn) The method of claim 128, wherein a current delivered to the cornea is
2 sensed during the medical procedure.

1 130. (Withdrawn) The method of claim 128, wherein a voltage delivered to the cornea is
2 sensed during the medical procedure.

1 131. (Withdrawn) The method of claim 128, wherein a temperature of the cornea is sensed
2 during the medical procedure.

1 132. (Withdrawn) The method of claim 128, wherein an impedance of the cornea is sensed
2 during the medical procedure.

1 133. (Withdrawn) The method of claim 128, wherein an optical characteristic of the cornea is
2 sensed during the medical procedure.

1 134. (Withdrawn) The method of claim 123, wherein the non-thermal energy is regulated
2 about a set-point.

1 135. (Withdrawn) The method of claim 123, wherein the non-thermal energy is regulated
2 about a set-curve.

1 136. (Withdrawn) The method of claim 128, wherein a profile of a physiological parameter is
2 determined and the non-thermal energy delivered to the cornea is regulated in accordance with
3 the profile.

1 137. (Withdrawn) The method of claim 136, wherein regulating includes decreasing the non-
2 thermal energy if the profile displays changes indicative of necrotic collagen structural
3 modification beyond a threshold level during the medical procedure.

1 138. (Withdrawn) The method of claim 136, wherein regulating includes terminating delivery
2 of the non-thermal energy if the profile exceeds a threshold level during the medical procedure.

1 139. (Withdrawn) The method of claim 136, wherein regulating includes terminating delivery
2 of the non-thermal energy if the profile includes a slope that exceeds a threshold level during the
3 medical procedure.

1 140. (Withdrawn) The method of claim 123, wherein regulating includes modulating a
2 duration of the delivery of the non-thermal energy.

1 141. (Withdrawn) The method of claim 123, wherein regulating includes modulating a level
2 of the non-thermal energy.

1 142. (Original) An apparatus that provides a non-thermal energy to a cornea through a probe
2 to perform a medical procedure that denatures collagen tissue and reshapes the cornea,
3 comprising:
4 a energy circuit that delivers a non-thermal energy to the cornea through the probe; and,
5 a sensing circuit that senses a change in a physiology of the cornea while said energy circuit
6 delivers the non-thermal energy to the cornea.

1 143. (Original) The apparatus of claim 142, wherein the non-thermal energy is in a
2 microwave frequency range.

1 144. (Original) The apparatus of claim 142, wherein the non-thermal energy is in an
2 ultrasonic frequency range.

1 145. (Original) The apparatus of claim 142, wherein the non-thermal energy is light.

1 146. (Original) The apparatus of claim 142, wherein the non-thermal energy is direct current.

1 147. (Original) The apparatus of claim 142, wherein said sensing circuit senses a current
2 delivered to the cornea.

1 148. (Original) The apparatus of claim 142, wherein said sensing circuit senses a voltage
2 delivered to the cornea.

1 149. (Original) The apparatus of claim 142, wherein said sensing circuit senses a temperature
2 of the cornea.

1 150. (Original) The apparatus of claim 142, wherein said sensing circuit senses an impedance
2 of the cornea.

1 151. (Original) The apparatus of claim 142, wherein said sensing circuit senses an optical
2 characteristic of the cornea.

1 152. (Original) An apparatus that provides a non-thermal energy to a cornea through a probe
2 to perform a medical procedure to denature collagen tissue and reshape the cornea, comprising:
3 an energy circuit that delivers a non-thermal energy to the cornea through the probe; and,
4 sensing means for sensing a change in a physiology of the cornea while said energy circuit
5 delivers the non-thermal energy delivered to the cornea.

1 153. (Original) The apparatus of claim 152, wherein the non-thermal energy is in a
2 microwave frequency range.

1 154. (Original) The apparatus of claim 152, wherein the non-thermal energy is in an
2 ultrasonic frequency range.

1 155. (Original) The apparatus of claim 152, wherein the non-thermal energy is light.

1 156. (Original) The apparatus of claim 152, wherein the non-thermal energy is direct current.

1 157. (Original) The apparatus of claim 152, wherein said sensing means senses a current
2 delivered to the cornea.

1 158. (Original) The apparatus of claim 152, wherein said sensing means senses a voltage
2 delivered to the cornea.

1 159. (Original) The apparatus of claim 152, wherein said sensing means senses a temperature
2 of the cornea.

1 160. (Original) The apparatus of claim 152, wherein said sensing means senses an impedance
2 of the cornea.

1 161. (Original) The apparatus of claim 152, wherein said sensing means senses an optical
2 characteristic of the cornea.

1 162. (Withdrawn) A method for performing a medical procedure on a cornea, comprising:
2 contacting a cornea with a probe;
3 delivering a non-thermal energy to the cornea through the probe; and,
4 sensing a change in a physiology of the cornea while the non-thermal energy is delivered to the
5 cornea.

1 163. (Withdrawn) The method of claim 162, wherein the non-thermal energy is in a
2 microwave frequency range.

1 164. (Withdrawn) The method of claim 162, wherein the non-thermal energy is in an
2 ultrasonic frequency range.

1 165. (Withdrawn) The method of claim 162, wherein the non-thermal energy is light.

1 166. (Withdrawn) The method of claim 162, wherein the non-thermal energy is direct current.

1 167. (Withdrawn) The method of claim 162, wherein a current delivered to the cornea is
2 sensed while the non-thermal energy is delivered to the cornea.

1 168. (Withdrawn) The method of claim 162, wherein a voltage delivered to the cornea is
2 sensed while the non-thermal energy is delivered to the cornea.

1 169. (Withdrawn) The method of claim 162, wherein a temperature of the cornea is sensed
2 while the non-thermal energy is delivered to the cornea.

1 170. (Withdrawn) The method of claim 162, wherein an optical characteristic of the cornea is
2 sensed while the non-thermal energy is delivered to the cornea